

CLAIMS:

1 1. A system comprising:
2 a shared memory; and
3 a plurality of processing elements coupled to said shared memory, wherein each
4 of said plurality of processing elements comprises a processing unit, a direct memory
5 access controller and a plurality of attached processing units, wherein said direct memory
6 access controller is configured to receive a plurality of commands from a corresponding
7 processing unit to be executed during one or more remote procedure calls, wherein each
8 of said plurality of attached processing units in each of said plurality of processing
9 elements does not interrupt said corresponding processing unit upon completion of each
10 of said one or more remote procedure calls.

1 2. The system as recited in claim 1, wherein said direct memory access controller
2 in each of said plurality of processing elements comprises a plurality of first level queues
3 for storing said plurality of commands issued by said corresponding processing unit.

1 3. The system as recited in claim 2, wherein each of said plurality of first level
2 queues are configured to store one or more commands of said plurality of commands
3 associated with a different attached processing unit.

1 4. The system as recited in claim 2, wherein said plurality of commands comprise
2 a first instruction to copy attached processing unit instructions associated with a
3 particular attached processing unit from said shared memory to said particular attached
4 processing unit, wherein said plurality of commands comprise a second instruction to

5 copy data associated with said attached processing unit instructions from said shared
6 memory to said particular attached processing unit.

1 5. The system as recited in claim 4, wherein said attached processing unit
2 instructions associated with said particular attached processing unit comprise instructions
3 that enable said particular attached processing unit to perform a particular operation on
4 said data associated with said attached processing unit instructions associated with said
5 particular attached processing unit.

1 6. The system as recited in claim 5, wherein said plurality of commands comprise
2 a third instruction to copy the results of said particular operation to said shared memory.

1 7. The system as recited in claim 4, wherein said first and second instructions to
2 copy attached processing unit instructions and data associated with said attached
3 processing unit instructions are requests to copy one or more lines of memory in said
4 shared memory to said particular attached processing unit.

1 8. The system as recited in claim 2, wherein said direct memory access controller
2 comprises a second queue, wherein said plurality of commands in said plurality of first
3 queues are merged in said second queue.

1 9. The system as recited in claim 8, wherein said direct memory access controller
2 comprises a third queue, wherein said third queue expands said merged plurality of
3 commands stored in said second queue into single line instructions.

1 10. The system as recited in claim 9, wherein said direct memory access controller
2 executes said expanded merged plurality of commands stored in said third queue without
3 bank conflicts.

1 11. The system as recited in claim 5, wherein said direct memory access controller
2 is configured to poll a status line of each of said plurality of attached processing units to
3 determine if any of said plurality of attached processing units completed its operation
4 during said one or more remote procedure calls.

1 12. The system as recited in claim 1, wherein said direct memory access controller
2 is configured to interrupt said corresponding processing unit at a synchronization point,
3 wherein said synchronization point occurs after said one or more remote procedure calls
4 are performed.

1 13. A system comprising:
2 a shared memory; and
3 a plurality of processing elements coupled to said shared memory, wherein each
4 of said plurality of processing elements comprises a processing unit, a direct memory
5 access controller and a plurality of attached processing units, wherein said direct memory
6 access controller is configured to receive a plurality of commands from a corresponding
7 processing unit to be executed during one or more remote procedure calls, wherein said
8 direct memory access controller is configured to poll a status line of each of said plurality
9 of attached processing units to determine if any of said plurality of attached processing
10 units completed its operation during said one or more remote procedure calls.

1 14. The system as recited in claim 13, wherein said direct memory access controller
2 in each of said plurality of processing elements comprises a plurality of first level queues
3 for storing said plurality of commands issued by said corresponding processing unit.

1 15. The system as recited in claim 14, wherein each of said plurality of first level
2 queues are configured to store one or more commands of said plurality of commands
3 associated with a different attached processing unit.

1 16. The system as recited in claim 14, wherein said plurality of commands comprise
2 a first instruction to copy attached processing unit instructions associated with a
3 particular attached processing unit from said shared memory to said particular attached
4 processing unit, wherein said plurality of commands comprise a second instruction to
5 copy data associated with said attached processing unit instructions from said shared
6 memory to said particular attached processing unit.

1 17. The system as recited in claim 16, wherein said attached processing unit
2 instructions associated with said particular attached processing unit comprise instructions
3 that enable said particular attached processing unit to perform a particular operation on
4 said data associated with said attached processing unit instructions associated with said
5 particular attached processing unit.

1 18. The system as recited in claim 17, wherein said plurality of commands comprise
2 a third instruction to copy the results of said particular operation to said shared memory.

1 19. The system as recited in claim 16, wherein said first and second instructions to
2 copy attached processing unit instructions and data associated with said attached
3 processing unit instructions are requests to copy one or more lines of memory in said
4 shared memory to said particular attached processing unit.

1 20. The system as recited in claim 14, wherein said direct memory access controller
2 comprises a second queue, wherein said plurality of commands in said plurality of first
3 queues are merged in said second queue.

1 21. The system as recited in claim 20, wherein said direct memory access controller
2 comprises a third queue, wherein said third queue expands said merged plurality of
3 commands stored in said second queue into single line instructions.

1 22. The system as recited in claim 21, wherein said direct memory access controller
2 executes said expanded merged plurality of commands stored in said third queue without
3 bank conflicts.

1 23. The system as recited in claim 13, wherein said direct memory access controller
2 is configured to interrupt said corresponding processing unit at a synchronization point,
3 wherein said synchronization point occurs after said one or more remote procedure calls
4 are performed.

1 24. A method for executing one or more remote procedure calls comprising the steps
2 of:

3 issuing a plurality of commands by a processing unit to a direct memory access
4 controller to be executed during one or more remote procedure calls, wherein said
5 plurality of commands comprise a first instruction to copy attached processing unit
6 instructions associated with a particular attached processing unit from a memory to said
7 particular attached processing unit, wherein said plurality of commands comprise a
8 second instruction to copy data associated with said attached processing unit instructions
9 from said memory to said particular attached processing unit;

10 issuing to said particular attached processing unit an indication to start a
11 particular operation on said data associated with said particular attached processing unit
12 instructions; and

13 polling a status line of each of a plurality of attached processing units to
14 determine if any of said plurality of attached processing units completed its particular
15 operation;

16 wherein said plurality of attached processing units do not interrupt said
17 processing unit upon completion of each of said one or more remote procedure calls.
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1 25. The method as recited in claim 24, wherein said attached processing unit
2 instructions enable said particular attached processing unit to perform said particular
3 operation.

1 26. The method as recited in claim 24, wherein said indication to start said particular
2 operation on said data is issued from said direct memory access controller to said
3 particular attached processing unit.

1 27 The method as recited in claim 24 further comprising the step of:
2 interrupting said processing unit at a synchronization point, wherein said
3 synchronization point occurs after said one or more remote procedure calls are
4 performed.

1 28. The method as recited in claim 24, wherein said direct memory access controller
2 comprises a plurality of first level queues for storing said plurality of commands.

1 29. The method as recited in claim 27, wherein each of said plurality of first level
2 queues are configured to store one or more commands of said plurality of commands
3 associated with a different attached processing unit.

1 30. The method as recited in claim 28, wherein said direct memory access controller
2 comprises a second queue, wherein said plurality of commands in said plurality of first
3 level queues are merged in said second queue.

1 31. The method as recited in claim 24, wherein said first and second instructions to
2 copy attached processing unit instructions and data associated with said attached
3 processing unit instructions are requests to copy one or more lines in said memory to said
4 particular attached processing unit.

1 32. The method as recited in claim 30, wherein said direct memory access controller
2 comprises a third queue, wherein said third queue expands said merged plurality of
3 commands stored in said second queue into single line instructions.

1 33. The method as recited in claim 32, wherein said direct memory access controller
2 executes said expanded merged plurality of commands stored in said third queue without
3 bank conflicts.

1 34. The method as recited in claim 28, wherein said direct memory access controller
2 comprises a second queue, wherein said plurality of commands in said plurality of first
3 queues are expanded in said second queue.

1 35. The method as recited in claim 34, wherein said direct memory access controller
2 comprises a third queue, wherein said third queue merges said expanded plurality of
3 commands stored in said second queue into single line instructions.

1 36. The method as recited in claim 35, wherein said direct memory access controller
2 executes said expanded merged plurality of commands stored in said third queue without
3 bank conflicts.